LW155

Program Update

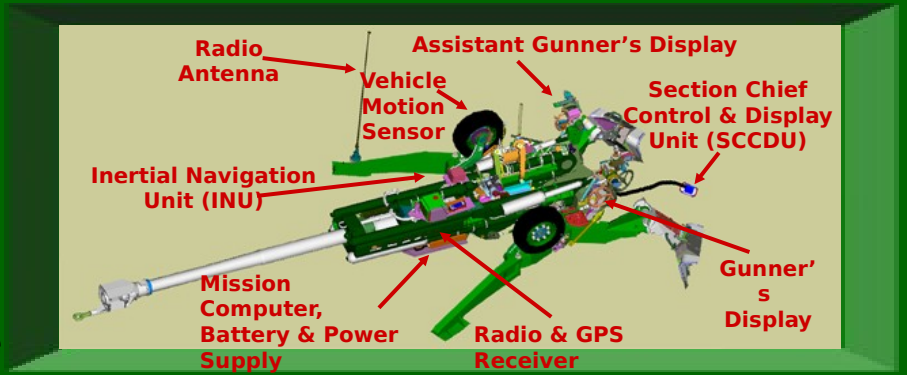
LW155 System
M777 and TAD

The Future of Towed Cannon

M777 Howitzer

- Lightweight High-Strength Titanium
- Improved Strategic Deployment
- Improved Ground Mobility
- Improved Survivability

Towed Artillery Digitization (TAD)



- Improved Accuracy
- More Responsive

Joint Requirements for M777 & TAD

The Future of Towed Cannon Artillery

M777

- 10,000 Lbs. or Less - Deployable and Mobile*
- Emplace in 3 Min*
- Displace in 2 –3 Min*
- All USAF (2 per C130, LW155 & FMTV in C141)
- Rate of Fire 4-8 RPM, Sustained 2 RPM
- Max Range 30km with Rocket Assist
- Bold Shift in 3 Min
- Primer Feed Mechanism
- 800 to 900 Rds Between Systems Abort

• Key Performance Parameters

Towed Artillery Digitization (TAD)

- Digital Indirect Fire Control
- Inertial Navigation with GPS Backup
- 1-Mil Pointing Accuracy
- TAD Weight: 200-500 Pounds

Why LW155?

The Future of Towed Cannon Artillery

More Mobile, More Rapidly Deployable, More Survivable and More Accurate than the M198

	LW155	M198	Improvement
Weight	10,000 lbs.	16,000 lbs	38%
Emplaces	2:28 min	6:35 min	260%
Displaces	2:15 min	10:40 min	470%
Terrain Trafficable	83%	63%	32%
C-130 Transport	2	1	100%
TAD Compatible	Yes	No	70%*

* Contributes to 70% Increase in Survivability

Program Evolution

The Future of Towed Cannon Artillery

Continuous Live Fire Test & Feedback from Troops

1989 First Prototype Fired

1990 USMC & US Army Field Evaluation

1994-95 Accuracy Demonstrations

1996 LW155 Shoot-off

1997 Contract Award & EMD Gun Design (8 Guns)

1998 Textron Novation

2001 Extensive Developmental Testing

2002 Final Developmental Testing

2002 OA & MS C

2004 OT & Full Rate Production D

2005 USMC IOC

2006 US Army TAD IO

Multi Year Contracting for LW155 Low Rate Initial Production (LRIP)

GENERAL DYNAMICS
Strength on Your Side™
Digital Fire Control
Burlington, VT
Prime Contractor & Developer,
Elevating Mass & Cradle Assembly
Barrow-in-Furness, England
LW155
TOWED ARTILLERY DIGITIZATION
Program Management
JPMO LW155
Picatinny Arsenal, NJ
SEILER INSTRUMENT
OFC
St Louis, MO
oto melara
Buffers, Balancers &
Accumulator
Oto Melara, Italy
Cannon Assembly
Watervliet Arsenal
Watervliet, NY
Elevating Gear
Wegmann USA
Lynchburg, VA
RTI International Metals, Inc.
Titanium
Niles, OH
Hydro-Mill Co.
A Triumph Group Company
Body Assembly
Hydro-Mill
Chatsworth, CA

Developmental Testing

The Future of Towed Cannon Artillery

✓ Completed

(Yuma Proving Ground)

- ✓ HFE Validation
- ✓ Firing Tables
- ✓ Initial TAD Component Firings
- ✓ •Strategic Lift
- ✓ Helo Lift
- ✓ Artic Evaluation (Ft Greely,AL)

(Yuma Proving Ground)

- ✓ Firing Tests
- ✓ •Extreme Temperature
- ✓ •NBC Decon. (Dugway
- ✓ •Manned Rate of Fire
- ✓ •Accuracy
- ✓ •Safety Release Testir
- ✓ •Reliability Growth

(Aberdeen Proving Ground)

- ✓ •Automotive Certification Testing
- ✓ •Rail Impact
- ✓ •Corrosion

(Twenty-Nine Palms)

- ✓ Logistics Demonstration
  - ✓ •Verify Manuals
    - ✓ Operator
    - ✓ Maintenance
  - ✓ Verify Training Materia

Operational Assessment for LRIP Decision

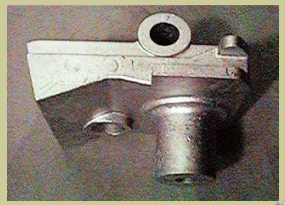
The Future of Towed Cannon Artillery

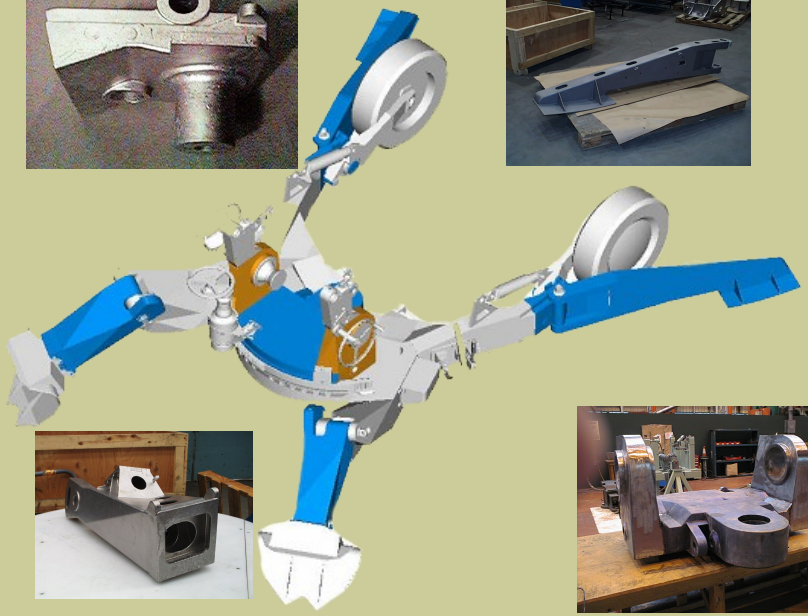
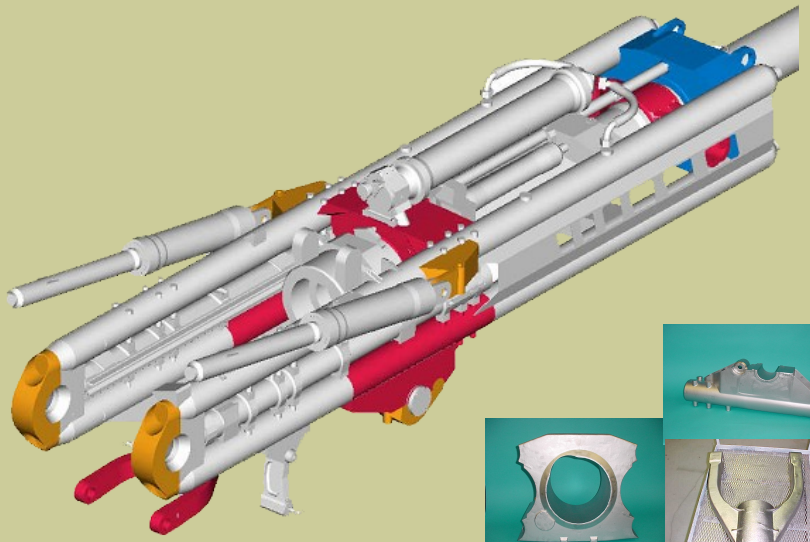
- **Three 96 Hour Scenarios Conducted with Two Weapons @ 29 Palms, CA**
  - Day/Night Operations
  - > 5000 Rounds Fired (Including Training)
  - > 1000 Miles Towed
  - 1st and 2nd Echelon Maintenance Tasks
  - Two Crews Each from both USMC and Army
    - XVIII AC
    - 11th Marines
  - Two Prime Movers
    - FMTV
    - MTVR
- **Amphibious Operations @ Camp Pendleton, CA (10-12 June 02)**
- **Shipboard Compatibility @ San Diego, CA (14-15 June 02)**

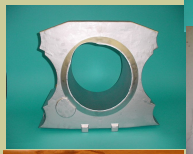
Performance Supported LRIP Decision

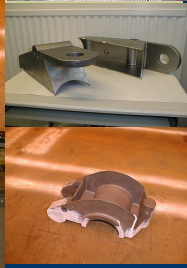
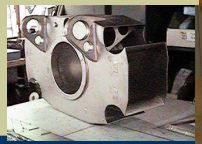
Introduction of Castings for Producibility

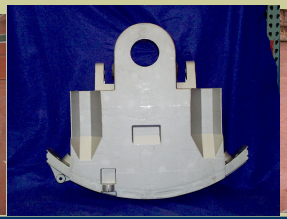
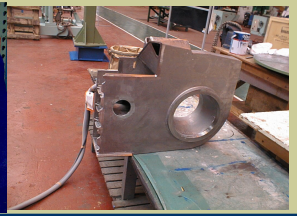
The Future of Towed Cannon Artillery





Reliability Improved By Weld Reduction

The Future of Towed Cannon Artillery

Titanium Structure Casting	Fabrication			
Cradle		324		172
Body	215		5	
Saddle	116		5	
Stabilizers	70		2	
Spades		120		2
Trails	98		2	
Elevating Yoke		19		1
Buffer Yoke	11		1	
Total Part Count	973		190	

80% Part Count Reduction for Ti Structures

75% Reduction in Number of Welds

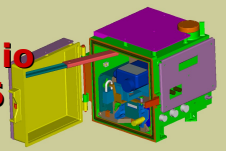
77% Reduction in Total Length of Welds

Towed Artillery Digitization

Gunner & Asst Gunner Displays

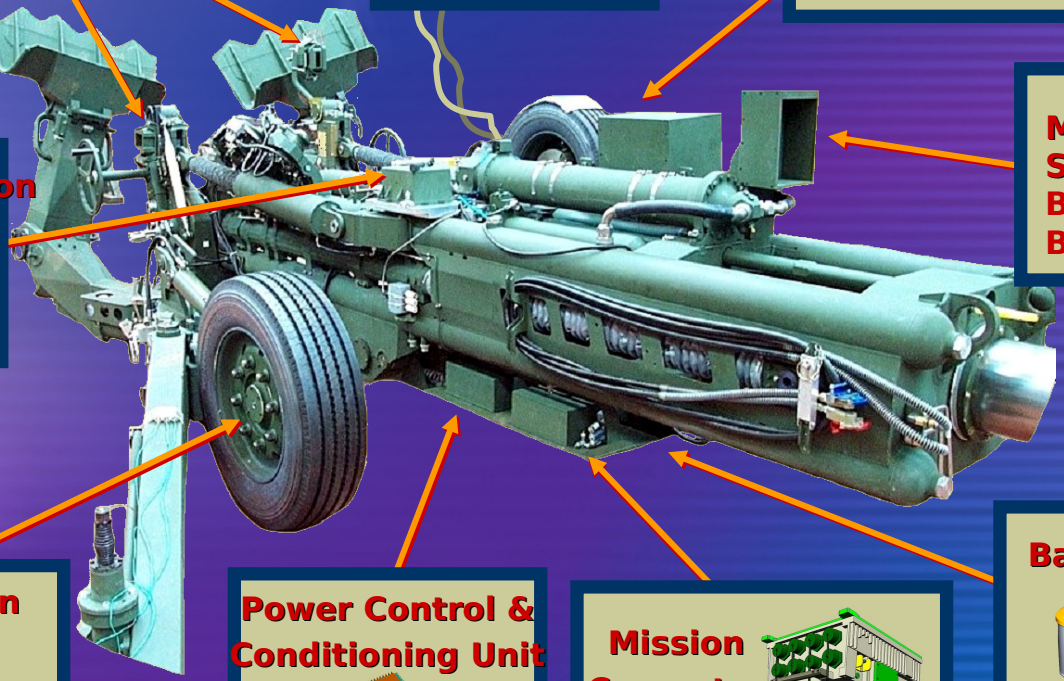
Section Chief Control Display Unit

Communications Box
- Radio
- GPS

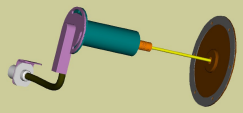


Inertial Navigation Unit

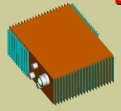
Muzzle Velocity System (MVS)
Block 1 = Interfaces
Block 2 = Integration



Vehicle Motion Sensor



Power Control & Conditioning Unit



Mission Computer

Batteries

Summary

- Program in Low Rate Initial Production
- Basic Gun Reliability Demonstrated
- TAD Centric Tests Critical to Program Success
- Continuing to Work Challenges

Focus on Combining OT's

- Alaska Jan 04
- 29 Palms Aug 04

Why LW155?

The Future of Towed Cannon Artillery

- **Joint Army / Marine Corps Howitzer - Replaces all Howitzers in the USMC, Provides Direct Support fires for SBCTs, and Replaces M198's in Army Objective Force Light and Special Purpose Forces.**

The M777E1 (M777 with Digital Fire Control) is:

- **Optimized for Versatility, Pro-Active Counter Fire, and Offensive Operations in Support of Light and Medium Forces**
- **More Mobile, More Rapidly Deployable, More Survivable and More Accurate than the M198**
  - **40% Lighter, 25% Smaller Footprint, 21% Lower Profile**

M777E1 Fly-weight

The Future of Towed Cannon Artillery

Actual Weight of OA Guns	**9097 Lbs**
Actual Weight of PP1	**9077 Lbs**
Actual Weight of PP1 (Post OA MODs)	**9211 Lbs**
Predicted Weight of PP2	**9257 Lbs**
Predicted Weight of DFCS System	**495 Lbs**
Predicted Weight of M777E1	**9774 Lbs**

Will Not Exceed 9800 lbs.

DFCS Hardware

Displays

The Future of Towed Cannon

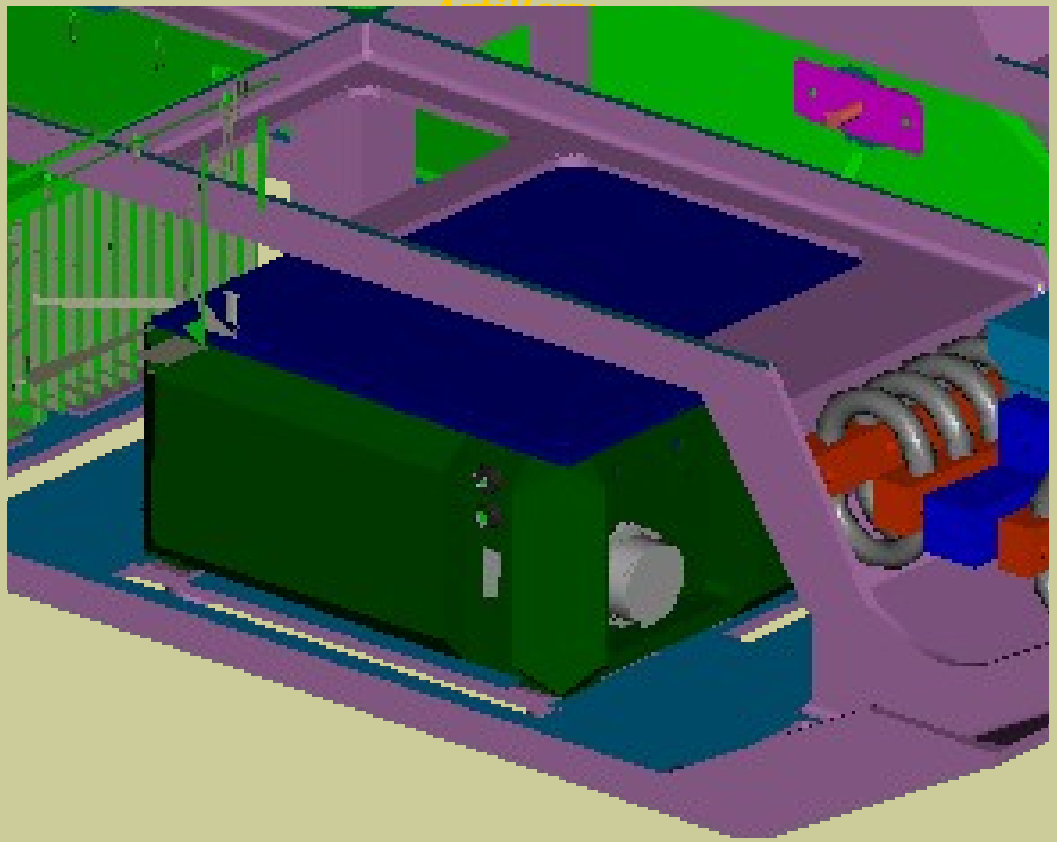
Chief of Section Display
GDC Canada

Asst./Gunner Display
GDC Canada

Power Conditioning and Control Module

Supplier – ESPEY

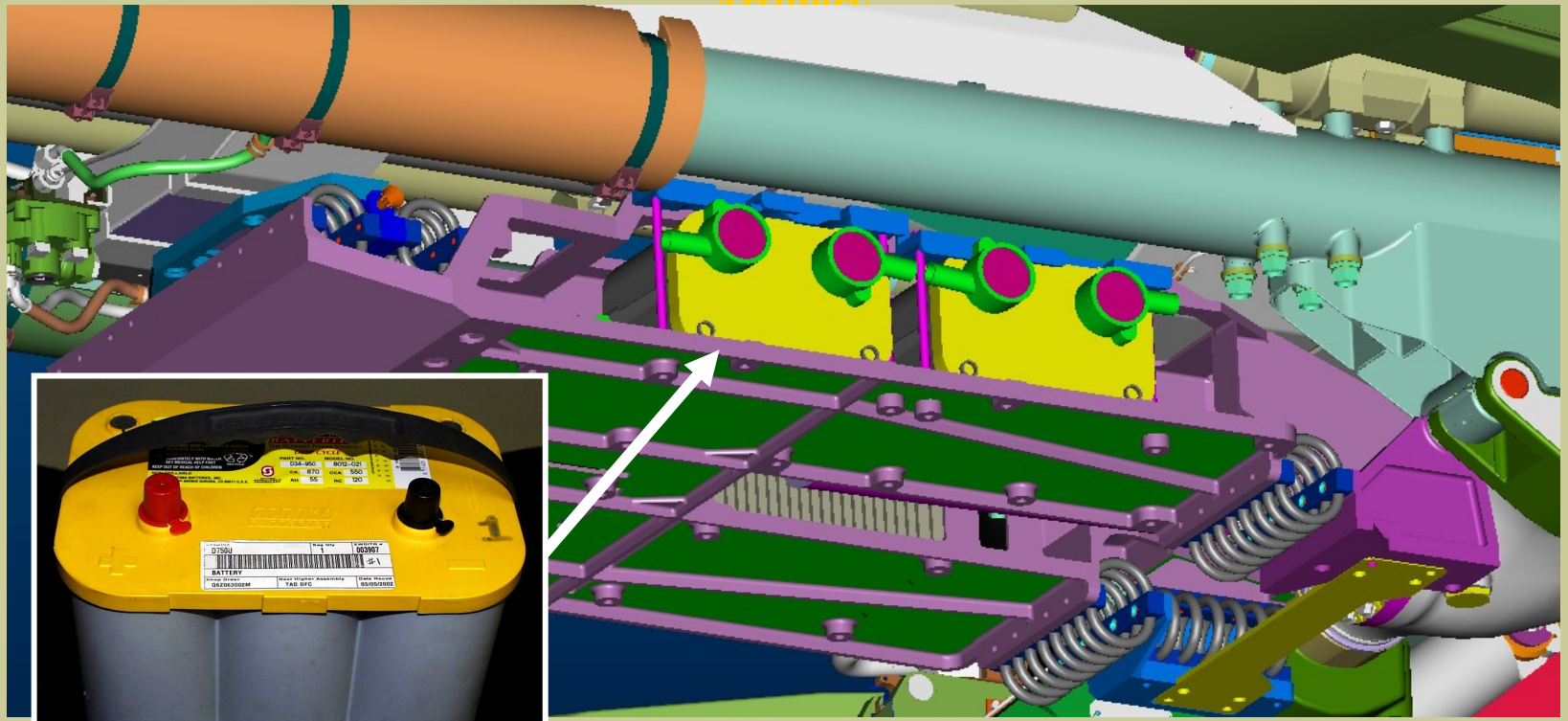
The Future of Towed Cannon



Lead Acid Battery (Absorbed Glass Matte)

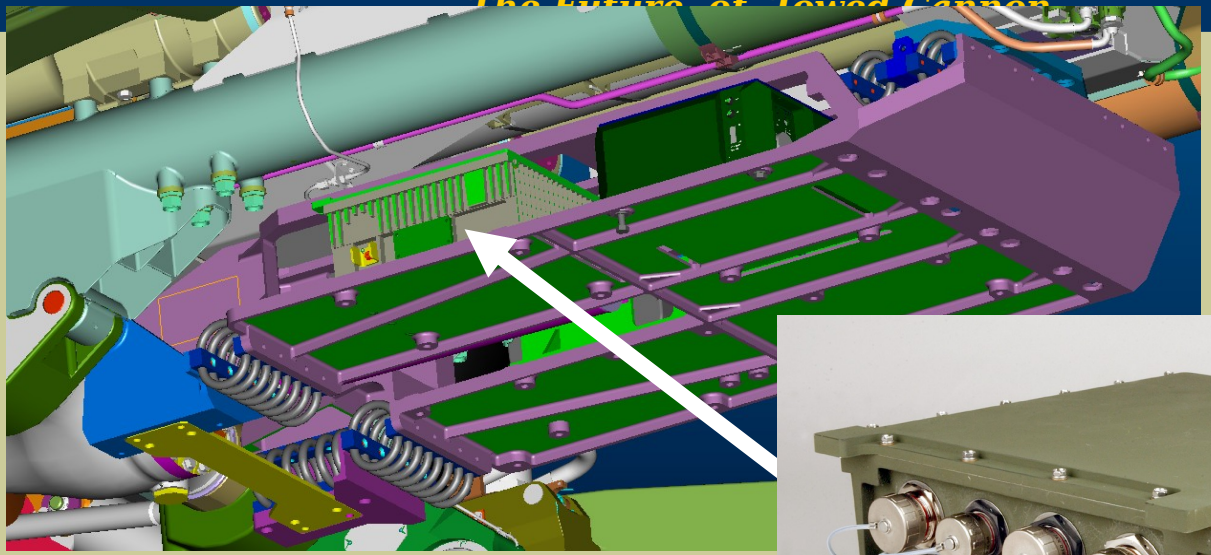
Supplier - Optima

The Future of Towed Cannon Artillery



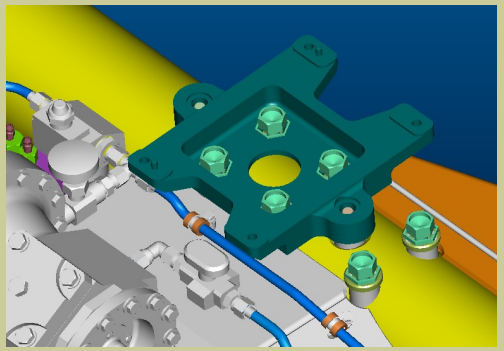
Mission Computer

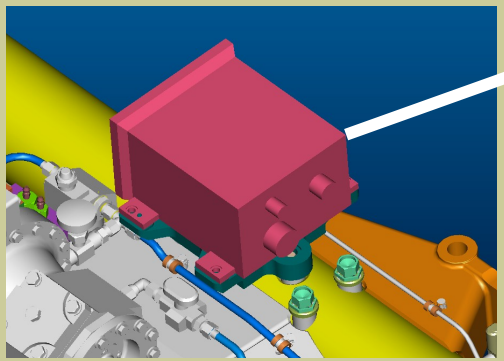
Supplier – General Dynamics Canada (GDC)



Position Navigation System Supplier – Honeywell

The Future of Towed Cannon Artillery





Test Issue (Cradle Tube)

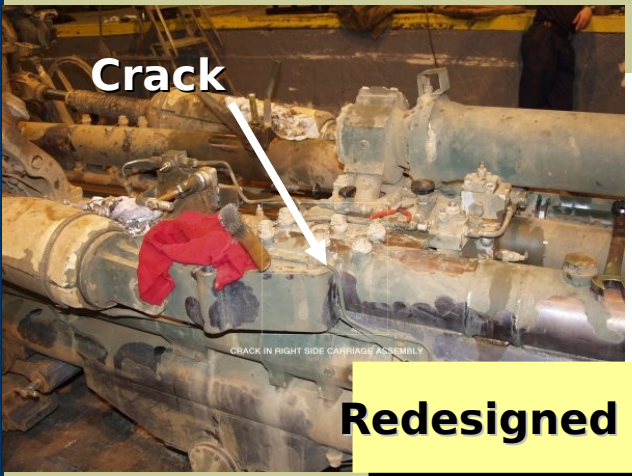
The Future of Towed Cannon Artillery

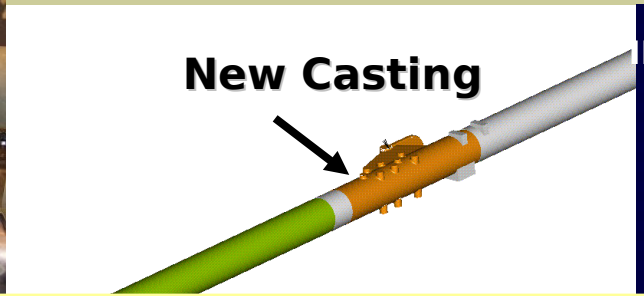
EMD (Welded Part)

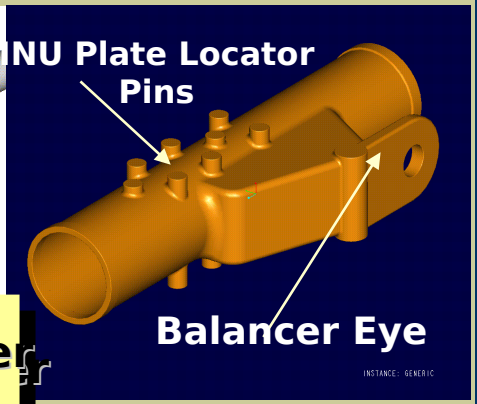
- Cradle Tube Failed During Corrosion Testing (Same Location on Two Different Cradles)
- Area of Multiple Weld
- Design Inadequate for Mobility Fatigue Loads

LRIP (Cast Part)

- Cast Part Will Not Fail
- Safety Factor Significantly Increased and Verified by Additional Testing







Redesigned Cast Part 2 Times Stronger

Tool Kits

The Future of Towed Cannon Artillery

- N6172 will disappear
- New “E” TAM will appear. Will be “EA” and 4, vice the “AR” as is with the N6172 currently.
- New kit will utilize items from the N6172 which can be applied to the M777.
- All M777 specific tools will be part of the kit. General Mechanics Tool kit will not be changed.
- RE198 Recoil exerciser will be utilized. Designing a shim kit to adapt to the M776 Cannon.
- KJ4000 is being purchased by the JPMO. Quantity will be 4 per Battalion
- IETM reader will be part of the new kit

M777 FIELDING

The Future of Towed Cannon Artillery

- **Fielding Schedule**

ANY QUESTIONS????

The Future of Towed Cannon Artillery

- PM is Colonel Garner
- Maintenance Officer is CWO4 Dominick.
- DSN 880-3846, Comm (973)724-3846